

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator mechanism from the energy source;

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range; and

a transmitter of electromagnetic radiation for transmitting a signal indicative of operation of the device,

the said reservoir including an exit aperture, for the substance, closed by a closure member that is sealingly retained relative to the aperture, the exit aperture being openable on operation of the actuator mechanism; wherein:

- (i) the latch is thermally actuated;
- (ii) the energy source is held in a potential energy state [by the latch] until the latch operates; and
- (iii) the device includes a heater for heating the latch whereby, on the receiver detecting the said radiation the receiver operates to power the heater and thereby release the latch, permitting expulsion of the substance from the reservoir; characterised in that:

the device also includes a restraint operable to limit operation of the actuator mechanism; and in that, on release of the latch, the restraint operates a switch to activate the transmitter for transmission of a said signal.

39. (amended) An ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, comprising

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;
an energy source, operatively connected for powering the actuator mechanism;
a releasable latch for controllably switching the application of power to the actuator from the energy source; and

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range;

the energy source including a compressed spring capable of [actring] acting on the actuator mechanism the expansion of which is initiatable by the latch and the work of the expansion of which causes operation of the actuator mechanism, characterised in that the spring, in its uncompressed state, has a minimum helical angle of 15°.

67 56. (amended) A device according to [any of Claims] Claim 39[, 42 or 50] wherein the actuator mechanism includes a piston moveable under power from the spring for compressing the substance in the reservoir to promote its expulsion therefrom, the spring being engaged at one end directly or indirectly with the piston and secured at its other end to a member fixed relative to the remainder of the device.
the device.

4 65. (amended) A device according to [any of Claims] Claim 59 [to 64] wherein the retainer includes a rib that reduces the cross sectional area of the hollow interior of the device in the vicinity of an opening therein.

7 77. (amended) A device according to [any of Claims] Claim 1, [3, 29, 33, 39, 42, 50 or 69] the reservoir of which includes a charge of liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

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8 78. (amended) A device according to [any of Claims] Claim 1, 3, 29, 33, 39, 42, 50 or 69,] including a radioisotope tag generating radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

3 81. (new) A method according to Claim 29, wherein the energy source includes an initially compressed, helical spring that is capable of acting on the actuator mechanism; the expansion of which is initiatable by the latch; and the work of the expansion of which causes operation of the actuator mechanism, the spring having, in its uncompressed state, a minimum helical angle of 15°.

2 82. (new) A method according to Claim 81 wherein the spring includes a wire whose diameter is approximately 0.8 mm.

3 83. (new) A method according to Claim 81 wherein the spring defines a hollow cylinder.

30 84. (new) A method according to Claim 29 wherein the energy source includes an initially compressed spring that is capable of acting on the actuator mechanism; the expansion of which is initiatable by the latch; and the work of the expansion of which causes operation of the actuator mechanism, the spring including a pair of wires each coiled in loops to define a pair of cylinder-like shapes, a first said cylinder-like shape being of a greater internal diameter than the outer diameter of the second said cylinder-like shape and the first cylinder-like shape encircling the second cylinder.

31 85. (new) A method according to Claim 84 wherein the wire of the first cylinder-like shape is looped in a clockwise direction and the wire of the second cylinder-like shape is looped in an anticlockwise direction; or *vice versa*.

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~~33~~ 86. (new) A method according to Claim 84 wherein the wires of the first and second cylinder-like shapes are wound in the same direction.

~~32~~ 87. (new) A method according to Claim 84 wherein the first and second cylinder-like shapes are spaced from one another in the radial direction of the spring cross-section.

~~34~~ 88. (new) A method according to Claim 84 wherein the at least one of the wires includes a coating of an insulator over at least part of its length, whereby to insulate it from the other said wire.

~~35~~ 89. (new) A method according to Claim 84 wherein the ends of the wires defining each said cylinder-like shape are flush with the adjacent loops thereof.

~~36~~ 90. (new) A method according to Claim 84 wherein the compressed length of the spring is approximately one-third of its length in the uncompressed condition.

~~37~~ 91. (new) A method according to Claim 84 wherein the force applied by the spring to the actuator mechanism exceeds the maximum resistive force resisting operation of the actuator, at the time when the maximum resistive force applies.

~~40~~ 92. (new) A method according to Claim 29, wherein the energy source includes an initially compressed spring that is capable of acting on the actuator mechanism; the expansion of which is initiatable by the latch; and the work of the expansion of which causes operation of the actuator mechanism, the spring including a stack of resiliently deformable discs, the periphery of each disc having formed therein a series of waves, the waves of respective said discs connecting such that the peak of each wave contacts the trough of a wave of an adjacent said disc.

~~41~~ 93. (new) A method according to Claim 92 wherein the waves of each disc radiate generally from its centre.

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~~42~~94. (new) A method according to Claim 92 wherein each disc is an annulus.

~~43~~95. (new) A method according to Claim 92 wherein each disc is an annulus and each annulus is about .25 mm thick and has three said waves, the peak to trough distance of the waves being about 2mm.

~~44~~96. (new) A method according to Claim 92 wherein each disc is an annulus and the spring includes sixteen said annuli secured together at the respective peaks and troughs of the waves.

~~45~~97. (new) A method according to Claim 92 wherein each disc is an annulus the outer diameter of which is about 8.5 mm and the inner diameter of which is about 4.5 mm.

~~28~~98 (new) A method according to Claim 81 wherein the actuator mechanism includes a piston that is moveable, under power from the spring, for compressing the substance in the reservoir to promote its expulsion therefrom, the spring being engaged at one end directly or indirectly with the piston and secured at its other end to a member that is fixed relative to the remainder of the device.

~~38~~99. (new) A method according to Claim 84 wherein the actuator mechanism includes a piston that is moveable, under power from the spring, for compressing the substance in the reservoir to promote its expulsion therefrom, the spring being engaged at one end directly or indirectly with the piston and secured at its other end to a member that is fixed relative to the remainder of the device.

~~46~~100. (new) A method according to Claim 92 wherein the actuator mechanism includes a piston that is moveable, under power from the spring, for compressing the substance in the reservoir to promote its expulsion therefrom, the spring being engaged at one end directly or

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indirectly with the piston and secured at its other end to a member that is fixed relative to the remainder of the device.

29 101. (new) A method according to Claim 98 wherein the spring, in use, encircles one or more further components of the device.

39 102. (new) A method according to Claim 99 wherein the spring, in use, encircles one or more further components of the device.

49 103. (new) A method according to Claim 100 wherein the spring, in use, encircles one or more further components of the device.

110 104. (new) A method of operating an ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, the device including an openable reservoir, for the substance, that is sealable against leakage of the substance; an actuator mechanism for opening the reservoir; an energy source that is operatively connected for powering the actuator mechanism; a releasable latch for controllably switching the application of power to the actuator mechanism from the energy source; a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range; and a transmitter of electromagnetic radiation for transmitting a signal indicative of operation of the device, the said reservoir including an exit aperture, for the substance, that is initially closed by a closure member that is sealingly retained relative to the aperture, the exit aperture being openable on operation of the actuator mechanism, the method comprising the steps of charging the reservoir with a said substance; setting the latch; causing ingestion of the device by a human or animal; and causing the receiver to detect electromagnetic radiation in the predetermined characteristic range, thereby causing expulsion of the substance from the reservoir

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via the exit aperture, the method including the steps of causing expansion from an initial, compressed state a helical spring defining the said energy source and having, in its uncompressed state, a minimum helical angle of 15°.

//5105 (new) A method of operating an ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, the device including an openable reservoir, for the substance, that is sealable against leakage of the substance; an actuator mechanism for opening the reservoir; an energy source that is operatively connected for powering the actuator mechanism; a releasable latch for controllably switching the application of power to the actuator mechanism from the energy source; a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range; and a transmitter of electromagnetic radiation for transmitting a signal indicative of operation of the device, the said reservoir including an exit aperture, for the substance, that is initially closed by a closure member that is sealingly retained relative to the aperture, the exit aperture being openable on operation of the actuator mechanism, the method comprising the steps of charging the reservoir with a said substance; setting the latch; causing ingestion of the device by a human or animal; and causing the receiver to detect electromagnetic radiation in the predetermined characteristic range, thereby causing expulsion of the substance from the reservoir via the exit aperture, the method including the steps of causing expansion from an initial, compressed state a spring, that defines the said energy source, including a pair of wires each coiled in loops to define a pair of cylinder-like shapes, a first said cylinder-like shape being of a greater internal diameter than the outer diameter of the second said cylinder-like shape and the first cylinder-like shape encircling the second cylinder.

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116 106. (new) A method of operating an ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, the device including an openable reservoir, for the substance, that is sealable against leakage of the substance; an actuator mechanism for opening the reservoir; an energy source that is operatively connected for powering the actuator mechanism; a releasable latch for controllably switching the application of power to the actuator mechanism from the energy source; a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range; and a transmitter of electromagnetic radiation for transmitting a signal indicative of operation of the device, the said reservoir including an exit aperture, for the substance, that is initially closed by a closure member that is sealingly retained relative to the aperture, the exit aperture being openable on operation of the actuator mechanism, the method comprising the steps of charging the reservoir with a said substance; setting the latch; causing ingestion of the device by a human or animal; and causing the receiver to detect electromagnetic radiation in the predetermined characteristic range, thereby causing expulsion of the substance from the reservoir via the exit aperture, the method including the steps of causing expansion from an initial, compressed state a spring, that defines the said energy source, including a stack of resiliently deformable discs, the periphery of each disc having formed therein a series of waves, the waves of respective said discs connecting such that the peak of each wave contacts the trough of a wave of an adjacent said disc.

86 107. (new) A device according to Claim 42 wherein the actuator mechanism includes a piston moveable under power from the spring for compressing the substance in the reservoir to promote its expulsion therefrom, the spring being engaged at one end directly or indirectly with

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the piston and secured at its other end to a member fixed relative to the remainder of the device.

⁹⁷ 108. (new) A device according to Claim 50 wherein the actuator mechanism includes a piston moveable under power from the spring for compressing the substance in the reservoir to promote its expulsion therefrom, the spring being engaged at one end directly or indirectly with the piston and secured at its other end to a member fixed relative to the remainder of the device.

⁴⁸ 109. (new) A device according to Claim 103 wherein the spring encircles one or more further components of the device.

¹¹¹ 110. (new) A device according to Claim 104 wherein the spring encircles one or more further components of the device.

²² 111. (new) A device according to Claim 60 wherein the retainer includes a rib that reduces the cross sectional area of the hollow interior of the device in the vicinity of an opening therein.

⁶¹ 112. (new) A device according to Claim 61 wherein the retainer includes a rib that reduces the cross sectional area of the hollow interior of the device in the vicinity of an opening therein.

²³ 113. (new) A device according to Claim 62 wherein the retainer includes a rib that reduces the cross sectional area of the hollow interior of the device in the vicinity of an opening therein.

⁸⁵ 114. (new) A device according to Claim 63 wherein the retainer includes a rib that reduces the cross sectional area of the hollow interior of the device in the vicinity of an opening therein.

⁹⁶ 115. (new) A device according to Claim 64 wherein the retainer includes a rib that

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reduces the cross sectional area of the hollow interior of the device in the vicinity of an opening therein.

49 116. (new) A device according to Claim 103 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir.

112 117. (new) A device according to Claim 104 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir.

50 118. (new) A device according to Claim 103 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir and wherein the cross section of the lip tapers towards its free edge.

113 119. (new) A device according to Claim 104 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir and wherein the cross section of the lip tapers towards its free edge.

51 120. (new) A device according to Claim 103 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir and wherein the cross section of the lip is generally parallel sided.

114 121. (new) A device according to Claim 104 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir and wherein the cross section of the lip is generally parallel sided.

52 122. (new) A device according to Claim 3, the reservoir of which includes a charge of liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

53 123. (new) A device according to Claim 29, the reservoir of which includes a charge of

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liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

62 124. (new) A device according to Claim 33, the reservoir of which includes a charge of liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

74 125. (new) A device according to Claim 39, the reservoir of which includes a charge of liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

8 126. (new) A device according to Claim 42, the reservoir of which includes a charge of liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

98 127. (new) A device according to Claim 50, the reservoir of which includes a charge of liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

108 128. (new) A device according to Claim 69, the reservoir of which includes a charge of liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

16 129. (new) A device according to Claim 3, including a radioisotope tag generating radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

53 130. (new) A device according to Claim 29, including a radioisotope tag generating radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

63 131. (new) A device according to Claim 33, including a radioisotope tag generating

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radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

⁷⁵ 132. (new) A device according to Claim 39, including a radioisotope tag generating radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

⁸⁸ 133. (new) A device according to Claim 42, including a radioisotope tag generating radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

⁹⁹ 134. (new) A device according to Claim 50, including a radioisotope tag generating radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

¹⁰⁹ 135. (new) A device according to Claim 69, including a radioisotope tag generating radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

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